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SPECIFICATION

"DISPENSING DEVICE FOR PAPER SHEETS OBTAINED BY MANUAL CUTTING FROM A CONTINUOUS BAND WITH TRIGGERING MECHANISM FOR A SPARE ROLL"

5 The present invention relates to devices for the controlled dispensing of portions of paper from a continuous band to be used as toilet paper or towels, and in particular to a device of the manually-operated type and provided with a mechanism for initiating a spare roll. Specific reference will be made hereafter to a toilet paper device, while it is clear that what is said can be applied with obvious modifications to paper towels, kitchen rolls and the like.

10 BACKGROUND OF THE INVENTION

There are known devices for dispensing sheets of paper from a continuous band in which it is the pull exerted by the user on the tip of paper projecting from the device that controls the feeding of a pre-established length of band and the cutting thereof. This type of device is preferable over the simpler type in which the cutting blade is fixed and the user must carry thereon the portion of paper to sever it from the band, since in this case it is left up to the user the choice of the length of the portion of band to be cut with consequential unavoidable wastes. Moreover, such a device implies the presence of a blade in an accessible and therefore potentially dangerous position.

20 These manually-operated devices include a cutting unit that can be made in different ways, for example with a blade that springs out radially from a rest position within the paper band feed roller, or with a blade that acts on the strip of paper in a radial direction from outside towards the inside of the feed roller by entering a longitudinal slot thereof.

25 However the preferred solution, to which reference will be made hereafter, is that where a first blade is mounted on the feed roller and a second blade is fixedly mounted and positioned to interfere with said first blade carried by the roller, said pair of blades being mounted and structured so as to achieve during the cutting a punctiform contact between a rigid blade and a yielding blade. Examples of this type of cutting mechanism are disclosed in patents EP 693268 and EP 930039, while it is clear that any kind of cutting unit among those mentioned above can be used in the present device.

35 Regardless of the type of cutting unit being used, there is provided a side knob so that the operator can manually rotate the roller when loading the device with a new roll. Unfortunately said operation must be repeated quite frequently for the devices placed in intensive use locations, typically public spaces, stations, etc.

Moreover there is problem of checking the device with the same frequency to make sure that the roll is not finished.

In order to overcome this drawback the applicant has been producing since some time a dispenser that includes a mechanism for automatically replacing the finished roll with a second spare roll also housed within the device. However this dispenser has the drawback that it can be used only with rolls of pre-cut paper, or it must be provided with a fixed blade for the cutting by the user as previously mentioned. This is due to the necessity of making the spare roll immediately available and operative, without requiring the intervention of the operator to initiate the latter through an automatic cutting unit of the type mentioned above.

SUMMARY OF THE INVENTION

Therefore the object of the present invention is to provide a device for dispensing paper sheets which overcomes the above-mentioned drawbacks.

This object is achieved by means of a device that combines a cutting unit, a roll replacement mechanism and means for initiating the spare roll.

The main advantage of the present device is that of combining the advantages of the above-mentioned two types of dispensers, so as to prevent waste of paper while extending the intervals between the operator interventions to check and re-load the device.

A second advantage of this device is given by the fact that the initiating means are useful not only at the time of the roll replacement, but they can also be used to make the paper tip project out of the device if for any reasons it occurs that the tip is not automatically dispensed.

A further advantage of said device is that this result is achieved through a very simple, cheap and reliable mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other advantages and characteristics of the device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig.1 is a perspective top view of the cutting unit of the present device;

Fig.2 is a perspective bottom view of said cutting unit combined with the roll replacement mechanism;

Fig.3 is a vertical sectional view from the left side of the device at the beginning of the use with two complete rolls;

Fig.4 is a view similar to the preceding one with the first roll used for about

2/3;

Fig.5 is a view similar to the preceding one with the first roll almost finished at the moment of the triggering of the replacement mechanism; and

5 Fig.6 is a view similar to the preceding one with the spare roll positioned for initiation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to figures 1 to 3, there is seen that the case of the device is made up of a rear base 1 to which, through top teeth 2, there is hinged a cover 3 provided with a bottom opening 4 as paper outlet, the teeth 2 acting also as a lock that can
10 be disengaged only by means of a suitable tool. The cover 3 is also connected at the bottom to the device body, in order to limit its rotation and to prevent its lifting, through a flexible strap (not shown) secured between the inside of the cover and the right end of the main shaft 5 of the cutting unit. On said shaft 5 there is also mounted a knob 6 for the initial feeding of the band when the device is loaded
15 with a new roll, so as to be able to rotate manually the feeding and cutting roller 7 mounted on said shaft 5.

Further details about the structure and operation of the feeding and cutting unit illustrated in fig.1 can be found in the above-mentioned patent EP 930039 that illustrates a similar unit twice the size, and provided with two pairs of blades, but
20 having substantially the same structure. In the present description there are underlined only the additional members that have been added to the device to provide the novel function of initiating the spare roll.

More specifically, on the sides of the frame 8 of the cutting unit there are pivoted a pair of rocker arms 9, 9', substantially shaped as an inverted L, rotatable
25 around pivots 10, 10' and kept raised by return springs 11, 11'. At the lower ends of the rocker arms there are provided pins 12, 12' on which internal projections (not shown) of cover 3 are rotatably engaged, so that a push of the user on the outside of cover 3, that rotates around teeth 2, is turned into a downward rotation of the horizontal portions of the rocker arms.

30 The right rocker arm 9 terminates on the front with a toothed sector 13 that engages a gear 14 also keyed on shaft 5, while the left rocker arm 9' is only meant to achieve a balanced movement of cover 3 since it does not engage any other member. Moreover, shaft 5 is also provided with a non-return mechanism due to which roller 7 can only rotate upward (when seen from the front) whereas the
35 driving in the opposite direction, as in the return travel of the toothed sector 13, is turned into a relative sliding of the engaged members.

In practice, thanks to the above-mentioned transmission mechanism, the user causes a rotation of roller 7 by pushing on cover 3 same as if the operator would act on knob 6 when the device is open. This allows to force the projection of the paper in case of clogging of the roll and it also favours the initiation of the spare roll at the time of replacing the first roll, in case it should be necessary. The present device furthermore includes other two members that cooperate with the above-mentioned mechanism to achieve said result.

The first member consists of an inclined notched plane 15 internally projecting downward from cover 3 at the upper portion of the cutting unit. More precisely, the plane is oriented so that its ideal extension arrives at the nipping line of paper C between roller 7 and an upper small counter-pressure roller 16.

The second member consists of a rubber panel 17 with a central cross-shaped cut 18, said panel 17 being secured to a transverse plate 19 that is in turn mounted on the frame 20 of the roll-holding unit. The starting tip S of the spare roll R' is inserted into cut 18 for the reason explained further on, said roll R' being placed in the device, as shown in fig.3, so that its downward movement does not cause the removal of tip S from panel 17.

Frame 20 is mounted on frame 8 through pivots 21, and on its inside there is a first pivot 22 that carries a pair of independent arms 23, 23' carrying respectively the first roll R and the spare roll R'. On the same internal side of frame 20, a second more advanced pivot 24 carries a plate 25 on which there is formed a cam 26. This cam 26 is shaped with a horizontal top portion 27 and a rear vertical portion 28 connected by a substantially curved front portion 29. Moreover, each arm 23, 23' is provided with a relevant peg 30, 30' positioned so that it can follow the profile of cam 26.

The simple and effective operation of the present device, as will be now illustrated, can be easily understood from the description above with the help of figs.4-6.

When the operator loads the device, the continuous paper band C unwound from roll R carried by arm 23 is introduced frontally between the counter-pressure roller 16 and roller 7, which is advanced by means of knob 6 until the band comes out through the opening 4. In this initial position peg 30' is close to the forward end of the horizontal portion 27 and therefore supports arm 23', cam 26 being supported in turn by peg 30 that is in the lower part of the curved portion 29 and prevents the rotation of plate 25 around pivot 24 since the position of arm 23 is defined by roll R resting on roller 16.

When the user pulls the projecting tip of band C, this causes the rotation of roller 7 and the subsequent cutting of a length of band. As shown in fig.4, as a result of the progressive decrease in diameter of roll R that is being used, arm 23 rotates downward and the relevant peg 30 gets closer to the bottom end of the curved portion 29, while arm 23' remains in the initial raised position.

Through the continuous drawing of paper the moment, illustrated in fig.5, is finally reached when the roll replacement mechanism starts its operation: the first roll is almost finished and arm 23 has rotated downward so much that peg 30 has "turned" from portion 29 to the vertical portion 28. As a consequence, peg 30 no longer prevents the rotation of plate 25 around pivot 24 due to the weight of the spare roll R', and a small rotation of the plate is sufficient for peg 30' to "turn" from the horizontal portion 27 to the curved portion 29 thus causing the descent of arm 23'. The same peg 30' then takes plate 25 back to the initial position thereof by following the profile of portion 29.

The position illustrated in fig.6 is thus reached, where arm 23' has taken the operating position occupied by arm 23 in fig.3, the latter having moved completely to the back under the push of the roll carried by arm 23'. The starting tip S of roll R', however, remains inserted in the transverse plate 19 during the descent of arm 23', so that the band forms a loop A extending between roller 7 and the inclined plane 15.

In this condition when the user pulls the projecting tip of roll R, still engaged between rollers 7 and 16, thus rotating roller 7 he also draws loop A into engagement between said rollers. As a consequence, during some dispensing cycles the device will dispense a double sheet, until roll R is finished, whereafter it will continue with roll R' only. In practice, once the first rotation of roller 7 is carried out, the starting tip S becomes disengaged from the transverse plate 19 and roll R' can be normally used.

In case roll R' is not automatically initiated in the above-described way, it is sufficient that the user pushes a few times on cover 3, which each time returns to the rest position thanks to springs 11, 11' as previously explained, for loop A to be nipped between roller 7 and roller 16 also thanks to the push and support of the notched plane 15.

When also roll R' is finished, in order to re-load the device the operator disengages teeth 2 with a suitable tool and opens cover 3 by rotating it downward so that it remains supported by pins 12, 12' and by the restraint strap. Then he rotates frame 20 forward to complete the rotation of arms 23, 23' that are loaded

with new rolls and re-positioned along cam 26, returns frame 20 to its rest position, secures tip S of the new roll R', manually initiates the first roll R by means of knob 6 and re-engages cover 3 on teeth 2 so as to go back to the initial position of fig.3.

5 It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, the means to retain tip S of roll R' can be different from the illustrated means 17, 18 19, as well as the kinematical connection that turns the push on cover 3 into a rotation of roller 7. In other words, the various members
10 such as rocker arm 11, toothed sector 13 and gear 14 can be replaced by other mechanically equivalent members, and the same applies to the roll replacement mechanism as long as the device operation is retained as illustrated above.



EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.07.1999 Bulletin 1999/29

(51) Int. Cl.⁶: A47K 10/36

(21) Application number: 98830550.4

(22) Date of filing: 22.09.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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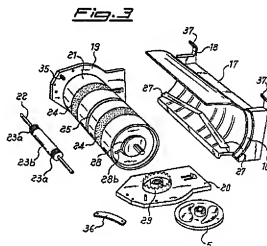
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(54) Dispensing device for paper towels obtained by manual cutting from a continuous band

(57) A dispensing device for paper towels cut from a continuous band includes a manually-operated feeding and cutting mechanism (M) provided with at least a pair of blades (26) mounted on a roller (21) and at least a pair of blades (27) fixedly mounted and positioned to interfere with the blades (26) carried by the roller (21), said pairs of blades (26, 27) being mounted and structured so as to achieve during the cutting a punctiform contact between a rigid blade and a yielding blade. Preferably, the fixed blades (27) are flexible and converging upwards whereas the rotating blades (26) are rigid and horizontal. The case of the device also includes catches (9) suitable to engage corresponding resilient latching means (37) formed on the mechanism (M) whereby the latter can be easily removed from the device.



Description

[0001] The present invention relates to devices for the controlled dispensing of portions of paper from a continuous band to be used as towels, and in particular to a device of the manually-operated type. In this kind of device it is the pull exerted by the user on the tip of paper projecting from the device that controls the feeding of a pre-established length of band and the cutting thereof

[0002] There are known dispensing devices for paper towels from a continuous band wherein the cutting blade is fixed and the user must carry thereon the portion of paper pulled out from the device, so as to sever it from the band and thus be able to use it. This type of device is very simple and reliable, but it leaves up to the user the choice of the length of the portion of paper to be cut with consequential unavoidable wastes. Moreover, it implies the presence of a blade in an accessible and therefore potentially dangerous position.

[0003] A natural evolution of said device is the automatic paper cutting, still through manually-operated device and without resorting to motor-driven solutions which are much more expensive and less reliable. An example of such a kind of device is a device wherein a blade-driving cam is provided which is connected to the paper-feeding roller, so that it springs out radially from a rest position within a longitudinal slot formed in the roller itself to a cutting position wherein it intersects the paper outside the roller. This involves a clear danger of a possible springing out of the blade while the user is manually performing the paper inserting operation on the feed roller. Moreover, it may be difficult to access the blade for its possible replacement, due to its position inside the roller.

[0004] Another kind of device similar to the preceding one is a device wherein the blade acts on the strip of paper in a radial direction from outside towards the inside of the feed roller by entering a longitudinal slot thereof. In this case, the blade is mounted on a cutting group by means of a fork pivoted and laterally guided so as to be operated in synchronism with the rotation of the roller. Though it overcomes the drawbacks of the preceding kind of device, however also this solution implies a fairly complicated mechanism which is therefore expensive and not completely reliable.

[0005] Still other kinds of device produce portions of band with saw-toothed or V-shaped cuts which therefore have an irregular and unpractical shape for the use as towels. Furthermore, the progressive wear of the blade and/or the occurring of plays may make the band cutting ever more difficult and irregular.

[0006] Therefore the object of the present invention is to provide a device for dispensing paper towels which overcomes the above-mentioned drawbacks.

[0007] This object is achieved by means of a device having the characteristics disclosed in claim 1.

[0008] A first advantage of the present device is to

provide an effective cutting which is consistent in time, with the automatic recovery of the play, if any. This result is achieved through a very simple, cheap and reliable mechanism.

[0009] A second advantage of this device is that it produces towels with a regular rectangular shape thanks to a straight cut which is perpendicular to the band axis.

[0010] A further advantage of said device is that it includes a feeding and cutting mechanism which can be easily replaced completely since it is mounted in a removable way inside the case of the device.

[0011] Still another advantage of the present device is to make easier the protrusion of the tip of paper for the following user. This is achieved by means of a small uncut central portion of the band which allows for exerting still a certain pull even after the cutting has been carried out.

[0012] These and other advantages and characteristics of the device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig. 1 is a schematic perspective view from the bottom of the closed and empty device;

Fig. 2 is a partial schematic front view of the above-mentioned device in the opened condition;

Fig. 3 is a schematic perspective view from the right of the feeding and cutting mechanism in a partially disassembled condition;

Fig. 4 is a schematic front view of the device of fig. 3 in the assembled condition; and

Fig. 5 is a schematic view from the left of the mechanism of fig. 4.

[0013] Referring to figs. 1 and 2, there is seen that the case of the device is made up of a rear base 1, an upper transparent dome 2 and a lower door 3. The case of the device has a lower slot 4 as paper outlet, as well as a circular opening on the right side for a knob 5 for initially feeding the band when the device is loaded with a new roll.

[0014] Dome 2 and door 3 are hinged to base 1 by means of horizontal hinges 6 which allow a frontal opening of the device. In base 1 there are formed holes 7 for the wall mounting, rests 8 for the roll, catches 9 for mounting the feeding and cutting mechanism M (as it will be made clear further on), catches 10 for locking door 3 and a sleeve 11 wherein there is rotatably inserted a roll support 12 having a variable width, so as to receive rolls of different width.

[0015] Slot 4 is formed partially in base 1 and partially in door 3, which also has a central rib 13 whose function will be illustrated later on. Door 3 also carries a pair of hooks 14 connected to a rod 15 and biased by a spring 16 into engagement with the locking catches 10 when door 3 is closed onto base 1. Dome 2 is retained in turn in its closed position by door 3.

[0016] With reference also to figs.3-5, the feeding and cutting mechanism M will be now illustrated. Mechanism M essentially includes a rear supporting member 17 with end vertical seats 18 for inserting a left side shoulder 19 and a right side shoulder 20, between which there are rotatably mounted a feeding and cutting roller 21 and a shaft 22 carrying a pressure group 23. The latter is made up of a pair of pressure rollers 23a made from rubber with a horizontal knurl, between which there is placed a small tube 23b acting as a spacer. The length of spacer 23b is such that the two rollers 23a abut on corresponding strips of rubber band 24 applied to roller 21.

[0017] In a central position on roller 21 there is formed a groove 25 which rib 13 of door 3 enters upon closure of the latter. In this way, the paper band carried by roller 21 is surely deviated out of the device by rib 13 through slot 4. Therefore there is no risk that the band remains on roller 21 beyond the angular rotatory position corresponding to the outlet slot 4.

[0018] A first pair of blades 26 is projectingly mounted in a longitudinal position on roller 21 in corresponding aligned horizontal seats, said seats being formed with an angle intermediate between the radial direction and the tangential direction. Blades 26 extend along the whole length of roller 21, but at groove 25, and they have a thickness sufficient to provide a suitable rigidity, indicatively 2 mm.

[0019] A second pair of blades 27 is mounted on the inner face of the rear support 17, i.e. on the side facing roller 21. Blades 27 are mounted in a position converging upwards, i.e. in the direction opposite to the feeding direction of the paper band, and they have a thickness suitable to provide an adequate flexibility, indicatively 0,3 mm.

[0020] Roller 21, in the illustrated embodiment, can only rotate clockwise (as seen from the right) since on the right end of its supporting shaft there is placed a counter-reverse spring 28. This spring 28 is a left-spiral spring and has a tip 28b which projects radially into engagement with one of the notches of a raised crown 29 formed on the inner face of the right shoulder 20. In this way, the clockwise rotation of roller 21 causes by reaction the "opening" of spring 28, whereas a counter-clockwise rotation causes the "closing" thereof on the shaft of roller 21 which is therefore braked.

[0021] Figure 5 illustrates in particular the spring group which provides the completion of the rotation of roller 21 so that the cutting is soft and light since it depends more on the spring strength than on the pull of the user on the band. Furthermore, the spring makes sure that an end tip of the band projects from the device for the following user. A crank 30 is keyed at one end thereof onto the axis of roller 21, and carries at its opposite end a pulley 31 rotatable around a relevant pin 32. A shaped spring 33 is mounted on a relevant pin 34 and engages pulley 31 between pin 32 and the axis of roller 21. Spring 33 is shaped so as to produce a rest position

of roller 21 (a little after the position shown in fig.5) and a position beyond which the rotation of roller 21 is completed under the push of spring 33, through crank 30, even if there is no more pull on the band by the user.

[0022] In order to keep the pressure group 23 pressed against roller 21 while allowing the passage of the protruding blades 26, the ends of shaft 22 are housed in radially elongated seats 35 and leaf springs 36 mounted on the outside of shoulders 19, 20 act on said ends.

[0023] As mentioned above, the whole mechanism M can be easily removed from the case of the device in which it is mounted through resilient latching means 37. These means 37 are formed on the support 17 at the top of seats 18, and they are shaped so as to engage catches 9 formed on base 1. In this way, mechanism M is retained between catches 9 and the bottom of base 1 at slot 4, and in order to pull it out it is sufficient to act on latches 37. In case of failure or maintenance it is therefore advantageous to replace the whole mechanism M rather than working on site, the removed mechanism being then easily serviced at the manufacturing company.

[0024] The simple and effective operation of the present device, as will be now illustrated, can be easily understood from the description above.

[0025] The continuous paper band unwound from the roll retained by support 12 is introduced from the front side between the pressure group 23 and roller 21 which is rotated through knob 5 until the band comes out through slot 4. When the user pulls the protruding tip of the band, this pull causes the rotation of roller 21 which carries blades 26 into contact with blades 27 fixed on support 17. The two pairs of blades are mounted so as to come into contact, with the flexible blades 27 which slightly bend upon the contact with the rigid blades 26. In particular, since blades 27 are inclined the contact does not occur along their whole length but just at a point which progressively moves from the center outwards. This produces a straight "scissors-like" cut perpendicular to the feeding direction of the band, thus obtaining a rectangular paper towel.

[0026] The presence of the counter-reverse spring 28 prevents a possible reverse motion of roller 21 at the end of the rotation under the push of spring 33. This makes sure that the tip to be pulled by the following user comes out. The use of a pair of rigid blades (26) and a pair of flexible blades (27) which intersect each other allows the automatic recovery of possible plays and/or wear within a certain amount. Moreover, the discontinuity in cutting at the central groove 25 allows to retain a small connection between the band and the cut portion, whereby no accidental fall of the towel produced by the cutting is possible.

[0027] It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, it is possible to reverse the arrangement of blades 26 and 27 by mounting the latter

on roller 21, and/or to mount blades 26 in an inclined position and blades 27 horizontally, or else to have the inclined blades converge in the same direction of feeding of the paper band whereby the cutting starts from the edges instead of starting from the center. Also, the inclined blades could be not converging but parallel whereby the cutting starts from an edge and from the center, or each pair of blades could include an inclined blade and a horizontal blade.

[0028] Even the number of blades may be different from those illustrated, e.g. by using more than two blades on roller 21 with more than one groove 25, or the pairs of blades could include longer and shorter blades, for example if groove 25 is not in a central position. It is also possible to replace the flexible blades 27 with rigid blades yet mounted in a yielding way, i.e. by means of biasing springs which allow a certain degree of motion upon contact with the rigid blades 26.

[0029] Similarly, latches 37, the spring group of roller 21, the counter-reverse spring 28, and so on could be replaced by other mechanically equivalent members and/or could be arranged in a different way.

Claims

1. A dispensing device for paper towels cut from a continuous band, comprising a case (1, 2, 3) housing a feeding and cutting mechanism (M) and provided with a lower slot (4) as band outlet, characterized in that said mechanism (M) includes at least a pair of blades (26) mounted on a feeding and cutting roller (21) and at least a pair of blades (27) fixedly mounted and positioned to interfere with said blades (26) carried by said roller (21), said pairs of blades (26, 27) being mounted and structured so as to achieve during the cutting a punctiform contact between a rigid blade and a yielding blade.
2. A device according to claim 1, characterized in that one of said pairs of blades (26, 27) is substantially flexible whereas the other pair is substantially rigid.
3. A device according to claim 2, characterized in that the flexible blades (27) are fixedly mounted and the rigid blades (26) are mounted on the roller (21).
4. A device according to claim 2 or 3, characterized in that the flexible blades (27) are metallic blades with a thickness of about 0,3 mm and the rigid blades (26) are metallic blades with a thickness of about 2 mm.
5. A device according to one or more of the preceding claims, characterized in that the fixed blades (27) are inclined and converging in a direction opposite to the feeding direction of the band whereas the blades mounted on the roller (21) are horizontally

aligned.

6. A device according to one or more of the preceding claims, characterized in that the case of the device includes catches (9) suitable to engage corresponding resilient latching means (37) formed on the feeding and cutting mechanism (M) whereby the latter is easily removable from the device.
7. A device according to one or more of the preceding claims, characterized in that the roller (21) includes a groove (25) which is entered by a rib (13) formed on the inner face of the case and suitable to deviate the band towards the outlet slot (4).
8. A device according to one or more of the preceding claims, characterized in that the feeding and cutting mechanism (M) includes a pressure group (23) pressed against the roller (21) by supporting and biasing means (22, 35, 36) suitable to provide it with a play sufficient for the passage of the blades (26) mounted on said roller (21).
9. A device according to one or more of the preceding claims, characterized in that the feeding and cutting mechanism (M) includes a counter-reverse spring (28) placed on the axis of the roller (21) and engaged in a fixed seat (29) so as to allow said roller (21) only one direction of rotation.
10. A device according to one or more of the preceding claims, characterized in that the feeding and cutting mechanism (M) includes a spring group (30, 31, 32, 33, 34) suitable to complete the rotation of the roller (21) so that an end tip of the band projects from the device for the following user.

Fig.1

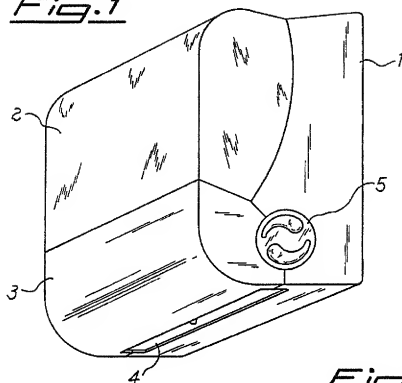


Fig.2

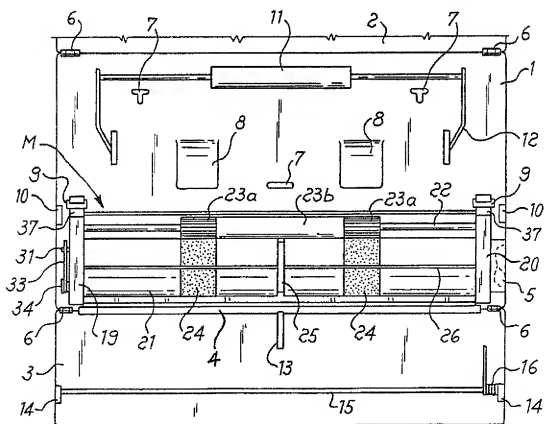


Fig. 3

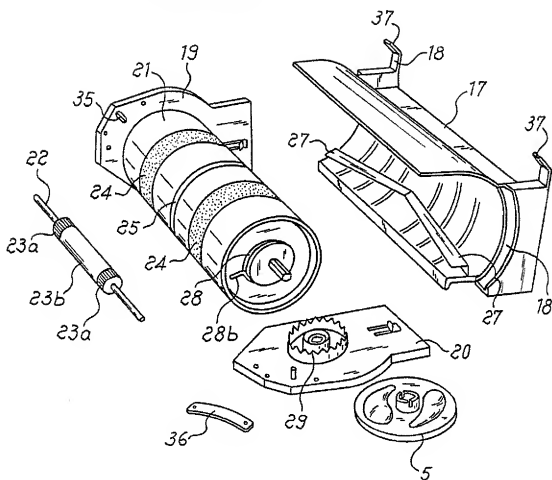


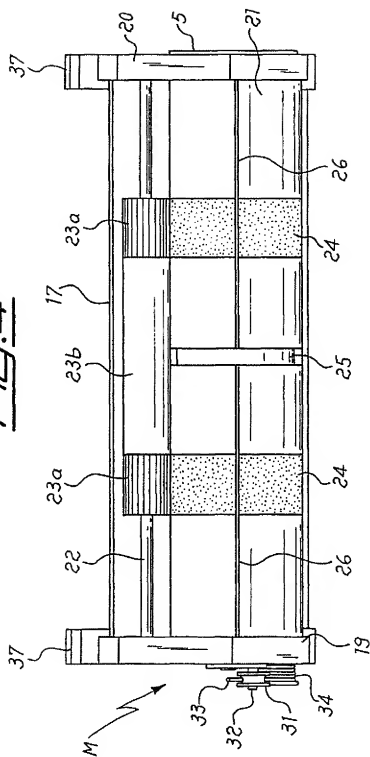
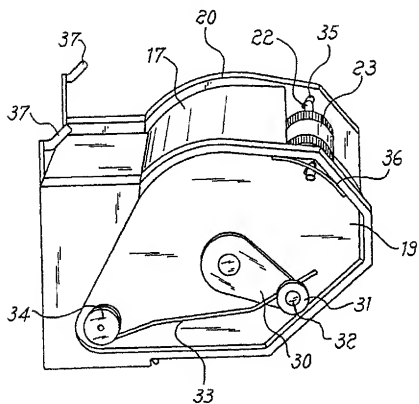
Fig. 4

Fig. 5





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Application Number
EP 98 83 0550

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